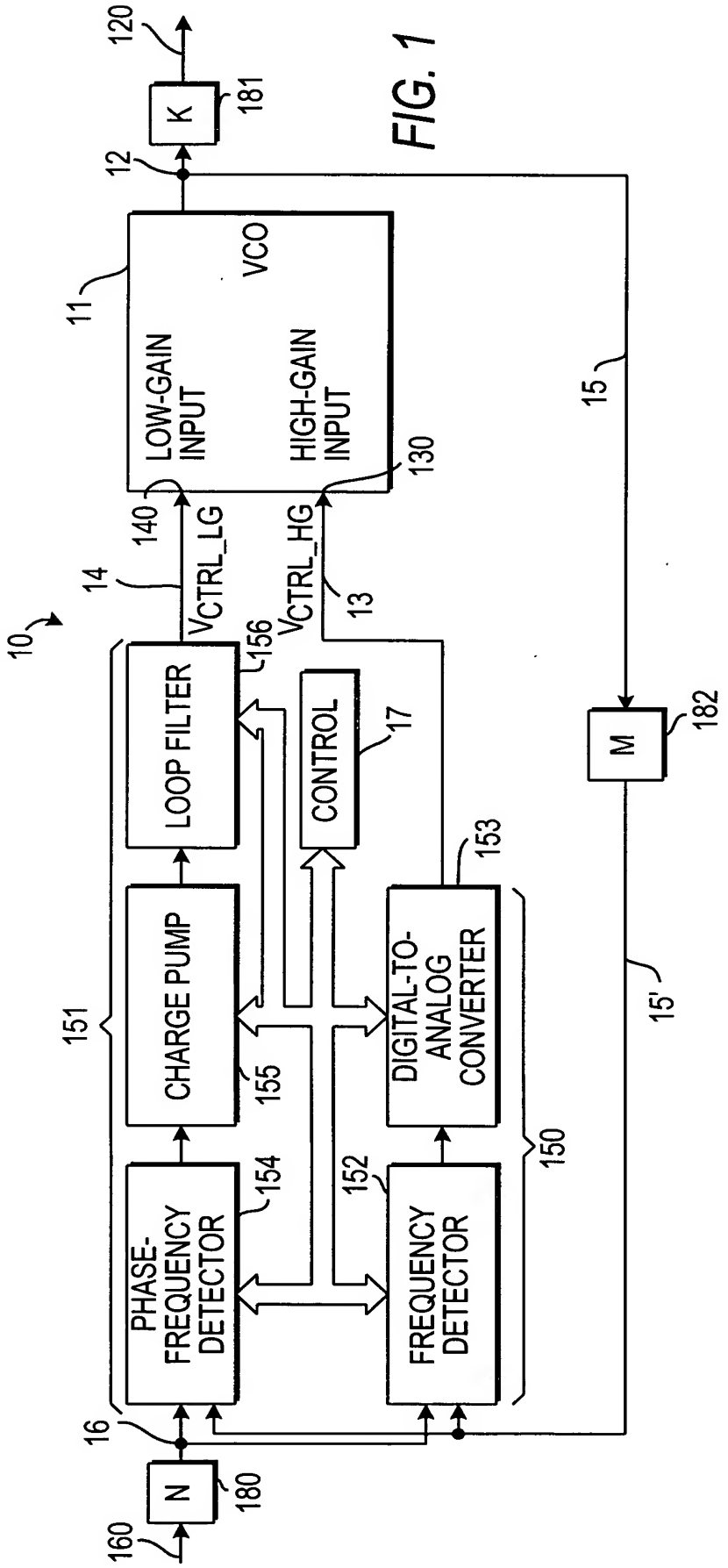

120
K
181
12
11
VCO
LOW-GAIN INPUT
HIGH-GAIN INPUT
130
15
140
14
VCTRL_LG
VCTRL_HG
13
10
156
LOOP FILTER
CONTROL
17
M
182
153
CHARGE PUMP
DIGITAL-TO-ANALOG CONVERTER
151
155
150
15'
PHASE-FREQUENCY DETECTOR
154
152
FREQUENCY DETECTOR
16
N
180
160

FIG. 1

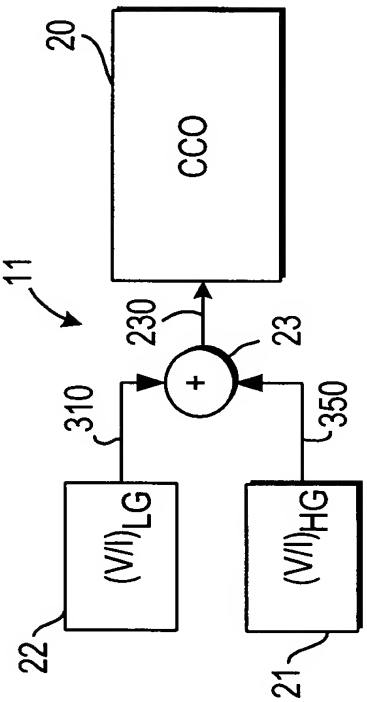

20
CCO
11
230
23
+
310
350
$(V/I)_{LG}$
$(V/I)_{HG}$
22
21

FIG. 2

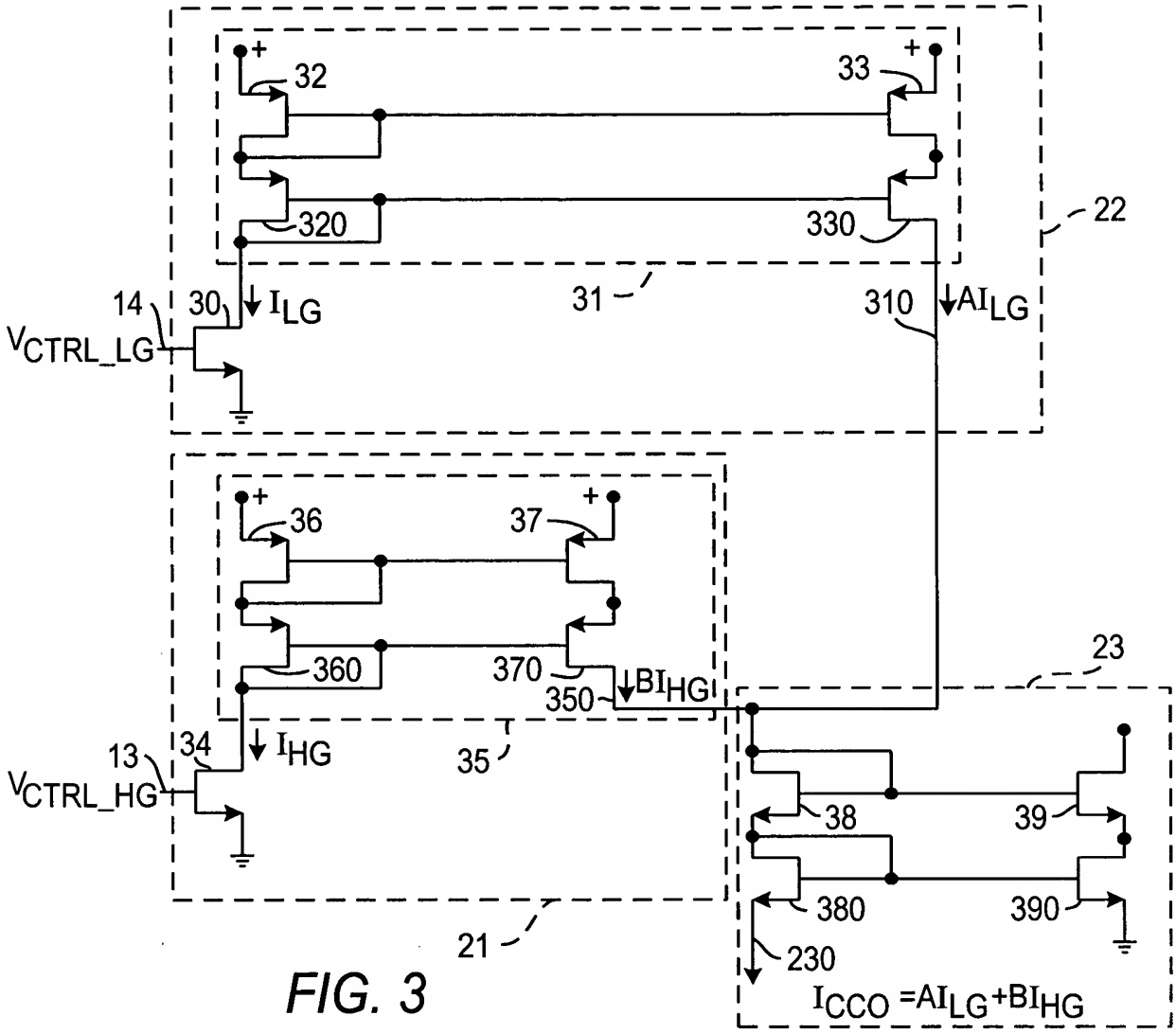

32
33
320
330
22
14
30
I_{LG}
31
310
AI_{LG}
V_{CTRL_LG}
36
37
360
370
350
BI_{HG}
23
13
34
I_{HG}
35
V_{CTRL_HG}
38
39
380
390
21
230
$I_{CCO} = AI_{LG} + BI_{HG}$

FIG. 3

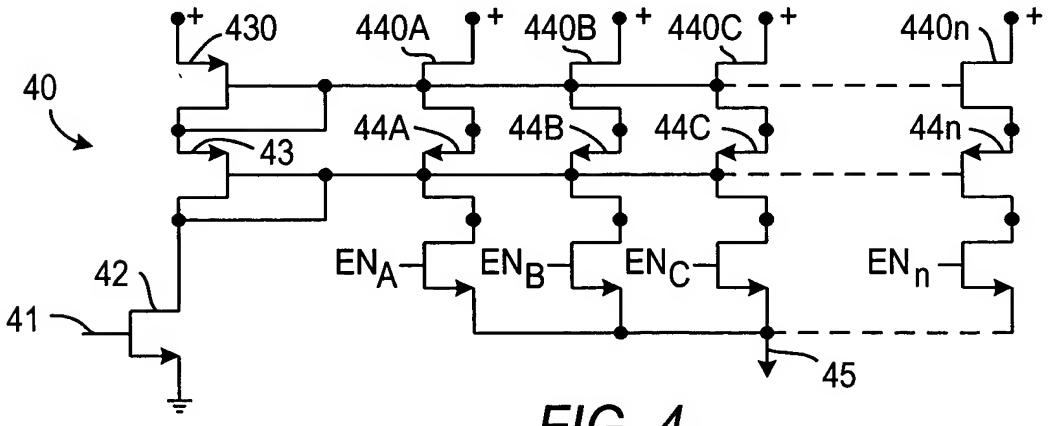

430
440A
440B
440C
440n
40
44A
44B
44C
44n
43
42
41
EN_A
EN_B
EN_C
EN_n
45

FIG. 4

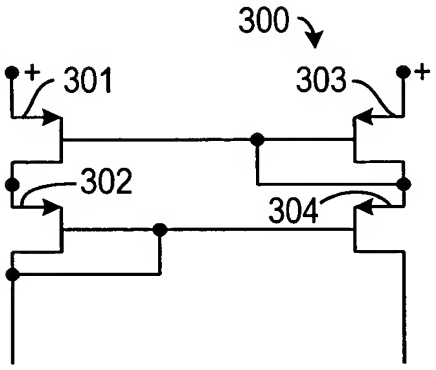


FIG. 3A

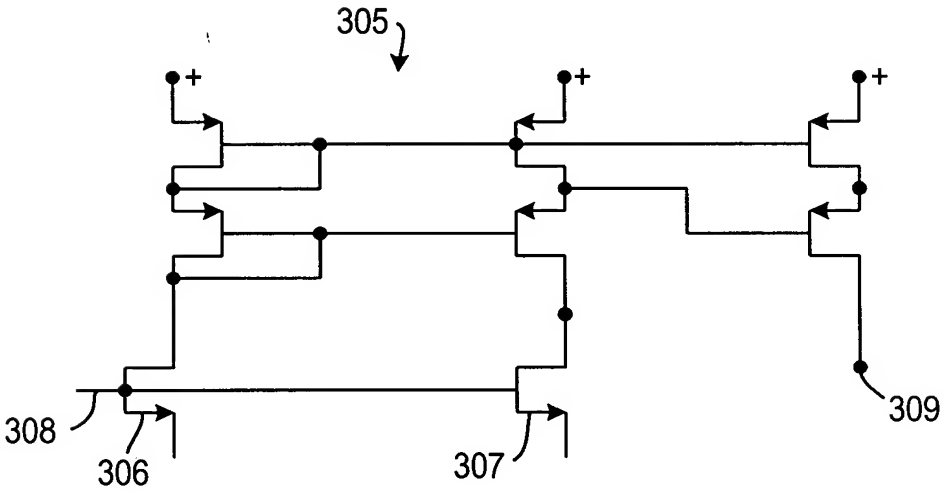


FIG. 3B

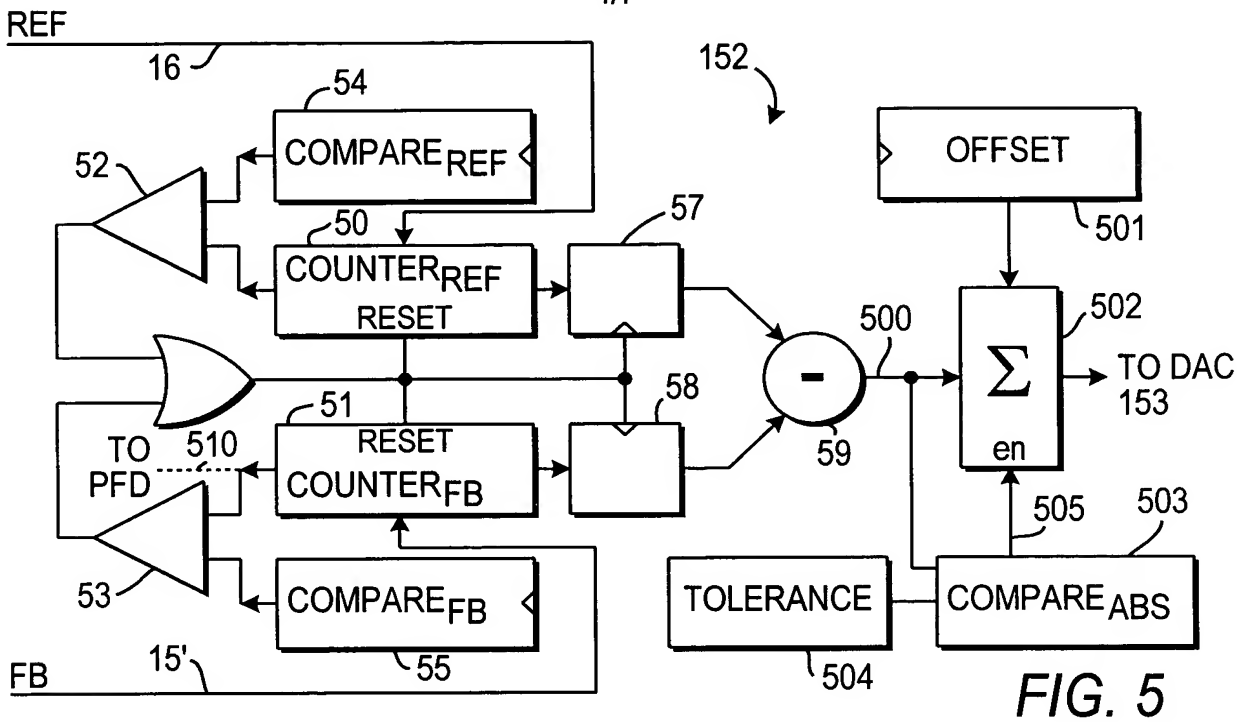


FIG. 5

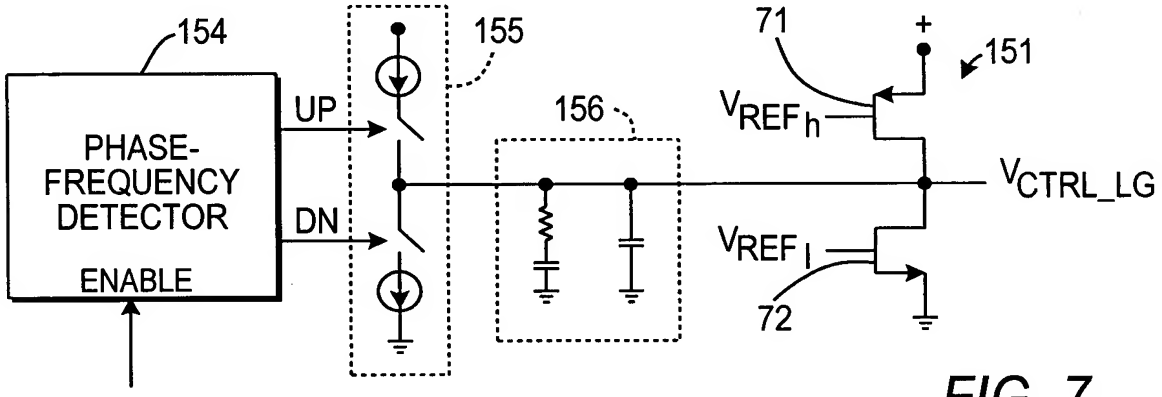


FIG. 7

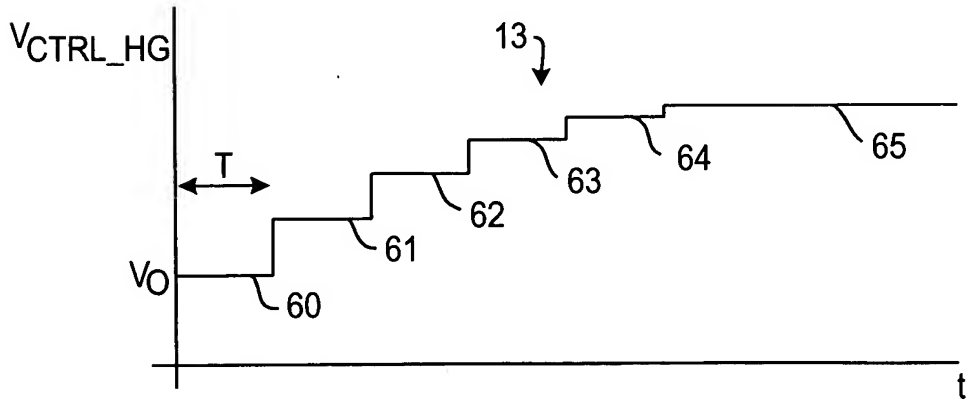


FIG. 6

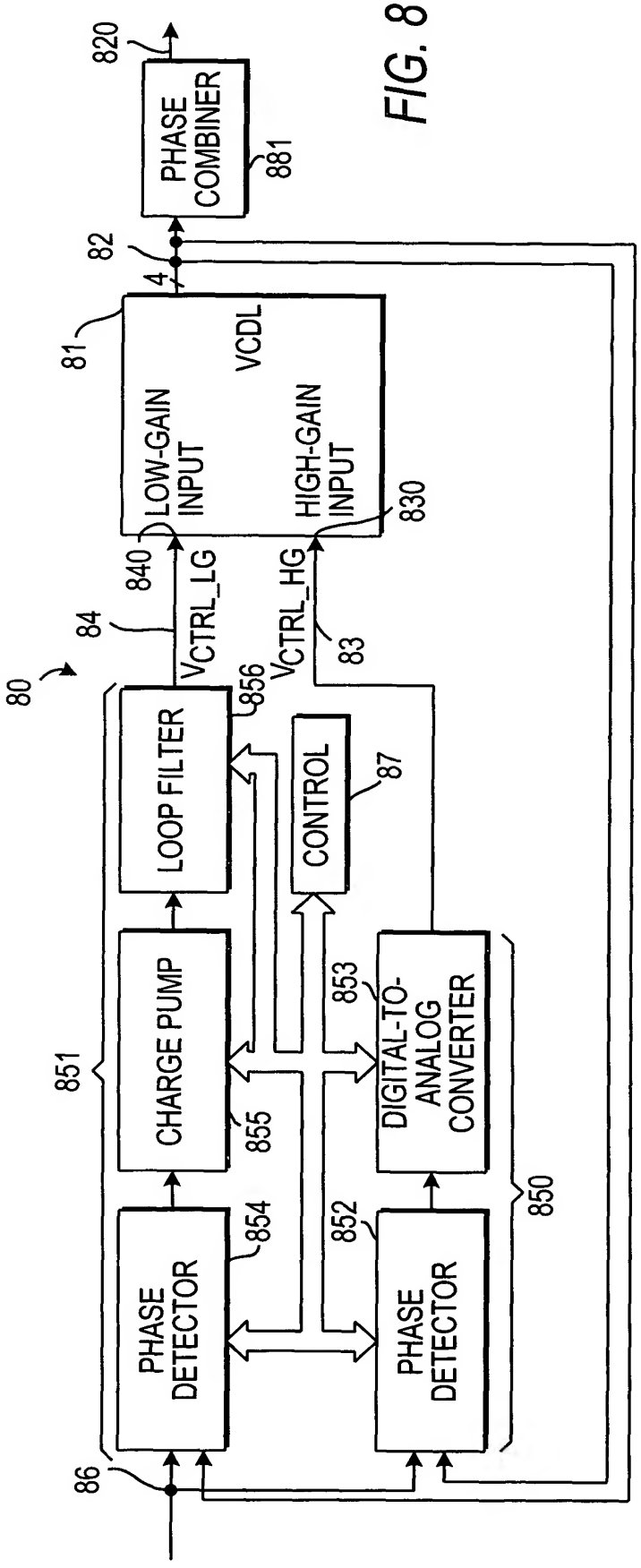

820
PHASE COMBINER
881
82
4
81
VCDL
LOW-GAIN INPUT
HIGH-GAIN INPUT
830
840
VCTRL_LG
VCTRL_HG
83
84
80
856
LOOP FILTER
CONTROL
87
851
CHARGE PUMP
855
853
DIGITAL-TO-ANALOG CONVERTER
854
852
PHASE DETECTOR
PHASE DETECTOR
850
86

FIG. 8

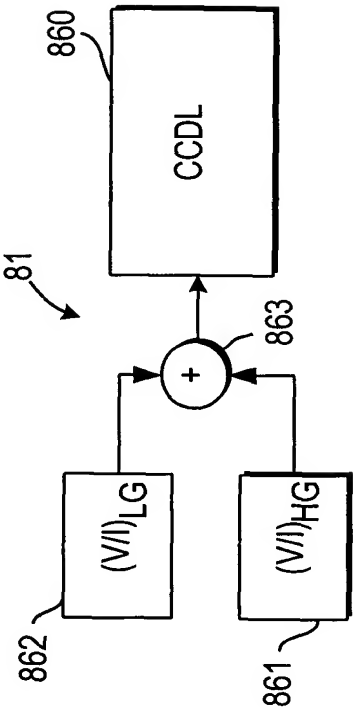
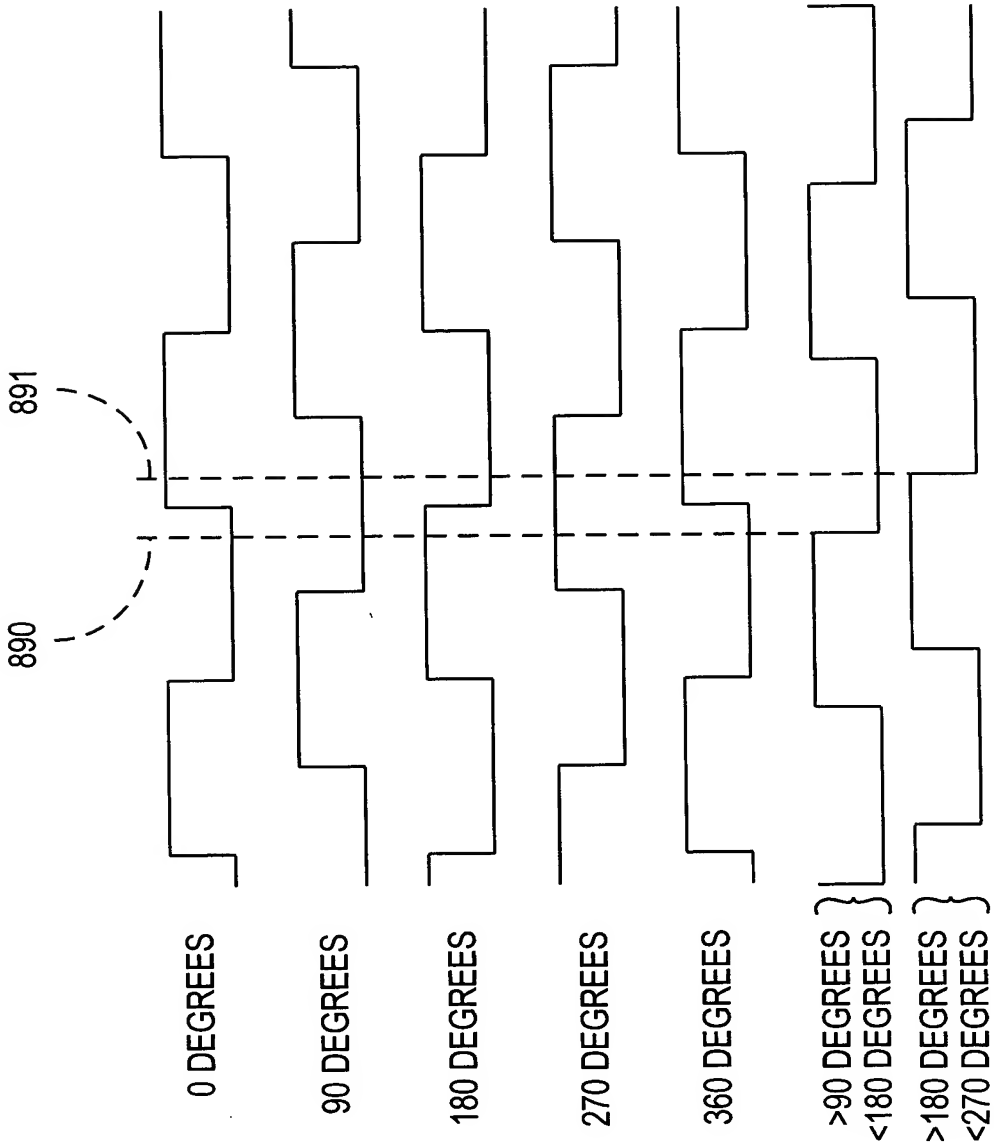

860
CCDL
81
863
+
(V/I)LG
(V/I)HG
862
861

FIG. 9

FIG. 10


891
890
0 DEGREES
90 DEGREES
180 DEGREES
270 DEGREES
360 DEGREES
>90 DEGREES <180 DEGREES
>180 DEGREES <270 DEGREES

7/7

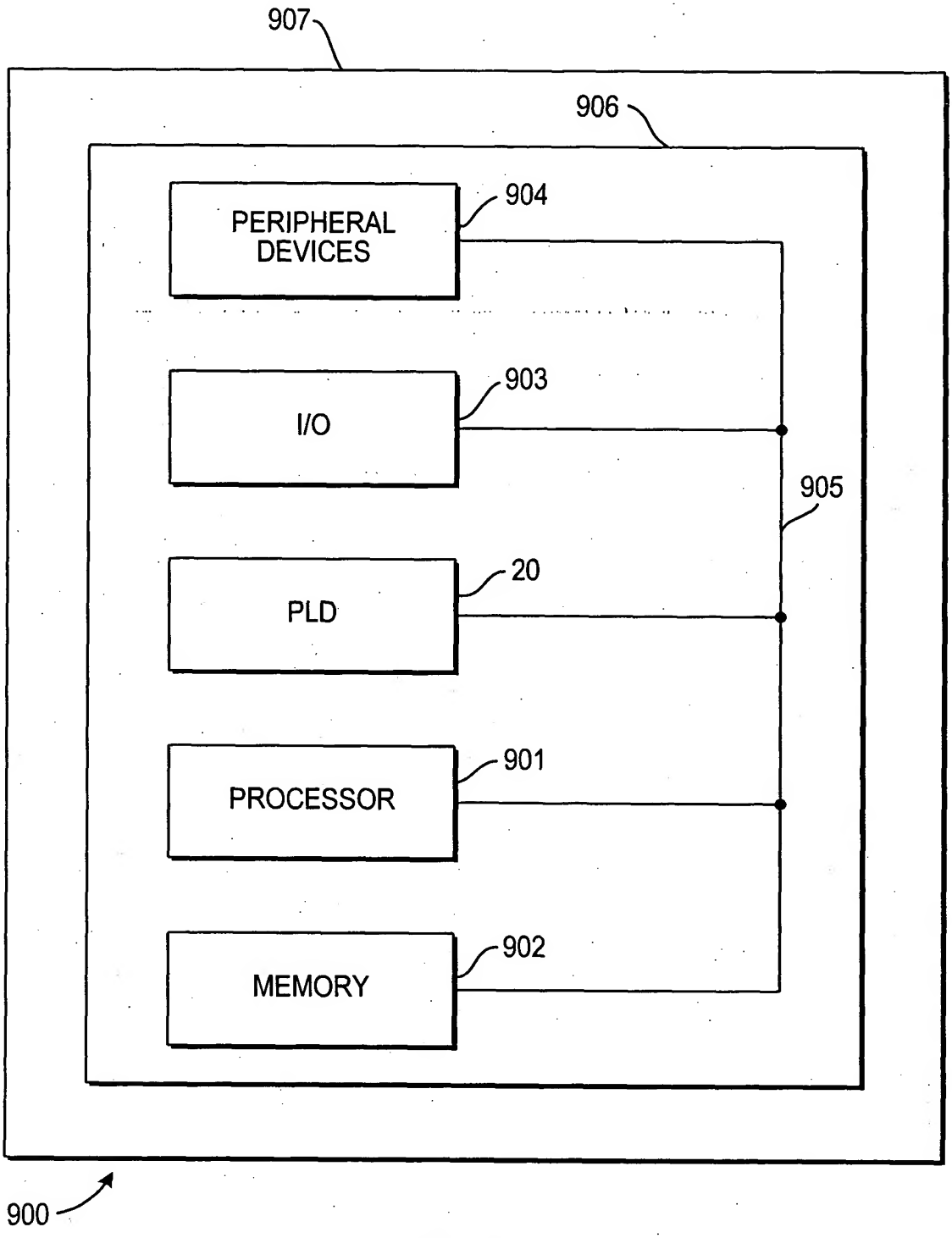

907
906
PERIPHERAL DEVICES
904
I/O
903
905
PLD
20
PROCESSOR
901
MEMORY
902
900

FIG. 11